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The linkage study of
Hamilton metal industries
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JAMES H. BATER
and
DAVID F. WALKER

THE LINKAGE STUDY OF HAMILTON METAL INDUSTRIES

HAMILTON
JAN 10 1972
HAMILTON ONTARIO

PUBLISHED JOINTLY BY:
HAMILTON PLANNING DEPARTMENT
HAMILTON CHAMBER OF COMMERCE
HAMILTON ECONOMIC DEVELOPMENT COMMISSION
1971

James H. Bater & David F. Walker
Dept. of Geography, University of Waterloo

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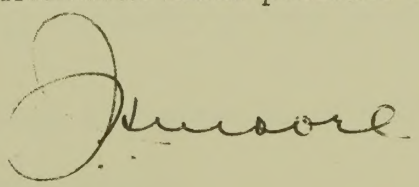
PREFACE

The Manager who is able to contact the largest number of his business associates within the shortest possible time obviously has an edge over a competitor who can contact only a few in the same period of time because of the disadvantages of location. Indeed this factor of accessibility of one business to the other is so important that some claim that the underlying linkages are one of the chief factors operating at the root of the trend for increased concentration of business within a few extremely powerful metropolitan areas of the western world.

The overall purpose of this publication is to provide an analysis of the structure and of the functioning of the Hamilton metal working complex. The study will be particularly helpful to the businessman involved in manufacturing in the Hamilton area.

The first financial support for the study came from the Canadian Council on Urban and Regional Research, and the National Advisory Committee on Geographic Research. Credit is therefore due to these two organizations for having, so to say, "primed the pump". The financial backing of the Hamilton Economic Development Commission in co-operation with the Planning Department of the City of Hamilton made possible the publication of the study.



J. H. Moore,
General Manager,
Hamilton Economic Development
Commission.

August, 1971.

TABLE OF CONTENTS

	Page
INTRODUCTION	
PART I	5
Historical Development	
Industrial Structure	
Metal and Machinery Industries	
Ownership and Local Entrepreneurship	
The Location of the Metal Industries within the Hamilton Area	
PART II	23
Goods Linkages	
Foreign Ownership and Goods Linkage	
Non-Goods Linkages	
PART III	40
Management Evaluation of the Hamilton Area	
Conclusion	

LIST OF TABLES

Table		Page
1.	Hamilton Area: Industrial Structure	8
2.	City of Hamilton: Industrial Structure	9
3.	Burlington: Industrial Structure	11
4.	Dundas: Industrial Structure	12
5.	Saltfleet Township and Stoney Creek: Industrial Structure	13
6.	Metal and Machinery Industries	15
7.	Number of Metal Plants by Employment Size	16
8.	Hamilton Area Metal and Machinery Industries: Material Linkages by Value, 1969	24
9.	Hamilton Area Metal and Machinery Industries: Market Linkages by Value, 1969	26
10.	Material Linkages for the Hamilton Area Metal Fabricating and Machinery Industries by Ownership	28
11.	Market Linkages for the Hamilton Area Metal Fabricating and Machinery Industries by Ownership, 1969	29
12.	Non-Goods Linkages of the Hamilton Area Metal Industries	31
13.	Type of Service Linkage by Regularity of Contact	33
14.	Location of Non-Goods Linkages	35
15.	Type of Non-Goods Linkages with Metropolitan Toronto	36
16.	Non-Goods Linkages of Selected Comparable Plants in Burlington and Central Hamilton	38
17.	Management Attitudes to the Hamilton Area	41
18.	Management Attitudes to Site	42

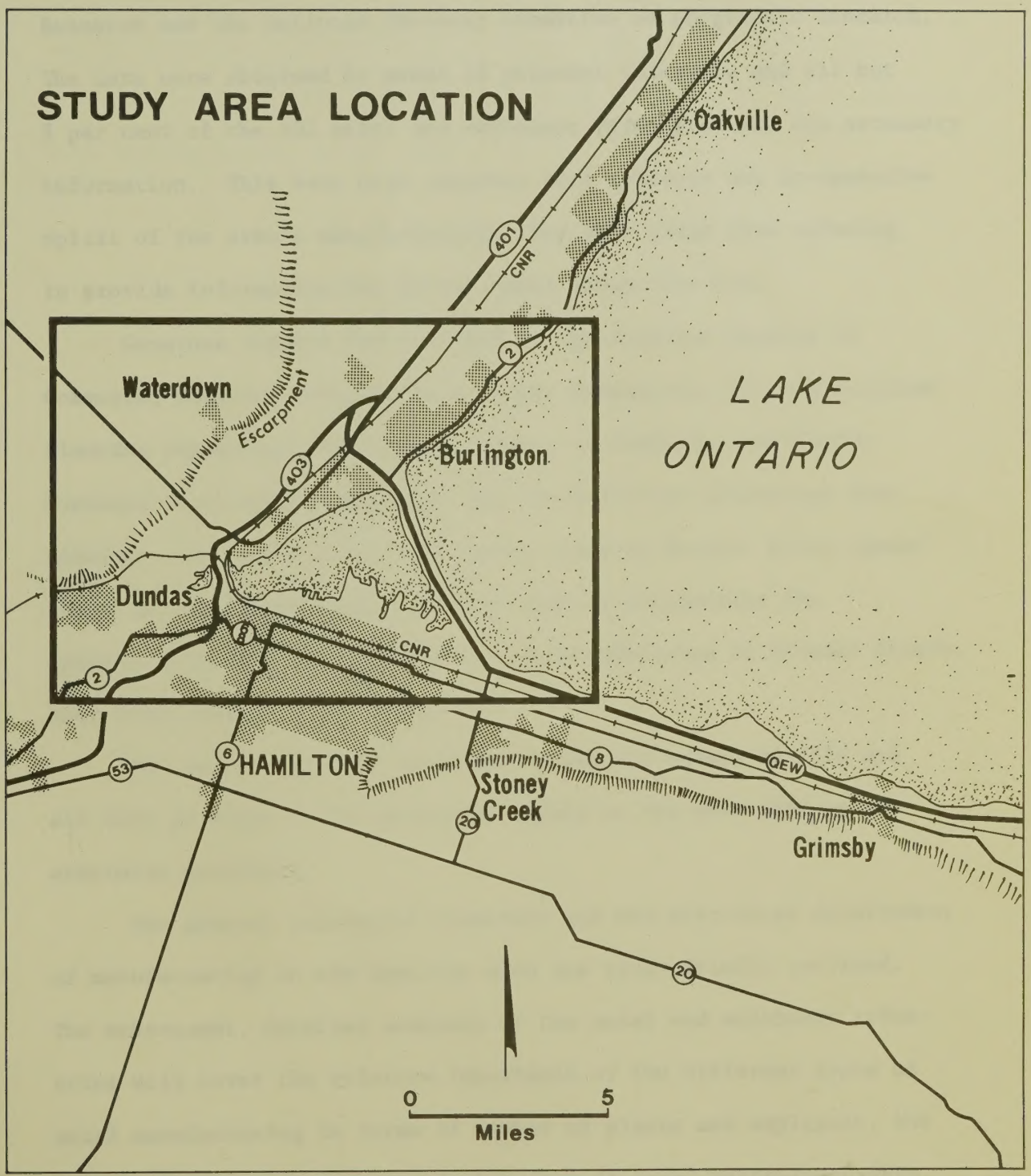
LIST OF ILLUSTRATIONS

Figure		Page
1.	Study Area Location	2
2.	Hamilton Area: Employment in Metal and Machinery Industries	19
3.	Metal and Machinery Plants: Commencement of Production	21
4.	Metal and Machinery Plants by Type	22

Introduction

The Hamilton area has had a long tradition as a manufacturing centre and is particularly noted for its strength in the metal industries. This short monograph provides an analysis of the primary metal, metal fabricating and machinery industries, major groups 12, 13 and 14 in the Standard Industrial Classification. Industries within these groups are interrelated in a number of ways, including the flow of materials and the provision of services. Other metal-using industries such as electrical products and transportation equipment have not been included in the study largely because metal items tend to be just one of a range of inputs into their productive processes and are very frequently not the most important in terms of value. The study area comprises the city of Hamilton, the towns of Burlington, Dundas and Stoney Creek, Saltfleet Township and the village of Ancaster (see Figure 1). Reference to the Hamilton area includes all of these constituent parts.

The monograph is based upon data gathered as part of a larger research study on manufacturing linkages in the Hamilton area. In addition to metal-working, the study included all types of manufacturing industry in Burlington, the Saltfleet industrial district and an inner city area of Hamilton. Financial support for the research was provided by the Canadian Council on Urban and Regional


STUDY AREA LOCATION
Oakville
401
CNR
Waterdown
Escarpment
403
Burlington
2
LAKE
ONTARIO
Dundas
8
CNR
2
6
HAMILTON
53
Stoney
Creek
20
8
QEW
Grimsby
20
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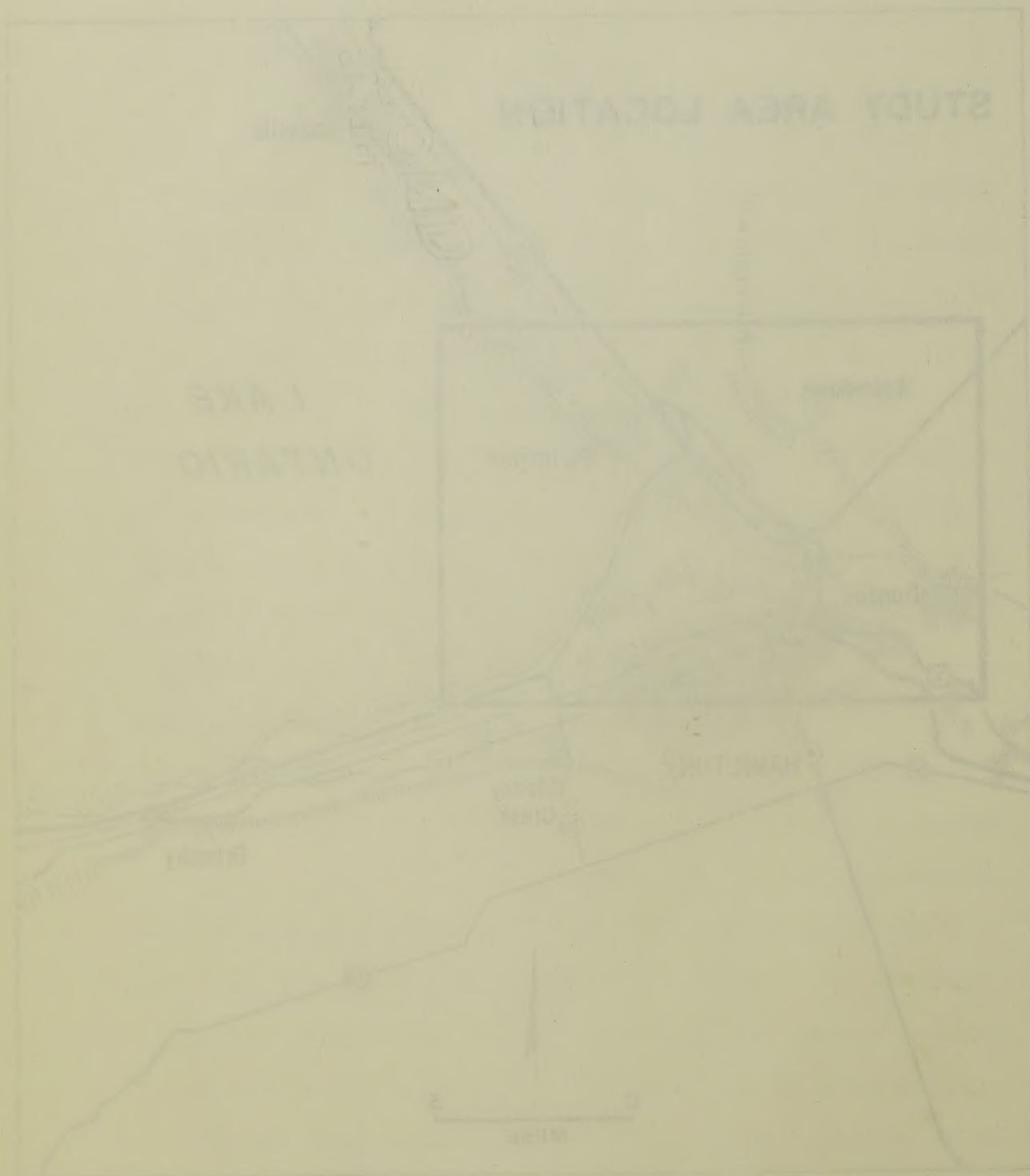
Miles



Research and the National Advisory Committee on Geographic Research. The data were obtained by means of personal interview and all but 8 per cent of the 202 metal and machinery firms provided the necessary information. This very high response rate reflects the co-operative spirit of the area's manufacturers. The only large firm refusing to provide information was Slater Steel Industries Ltd.

Generous support was provided by the Hamilton Chamber of Commerce, Hamilton Economic Development Commission, City of Hamilton Planning Department, Burlington Chamber of Commerce, Burlington Business Development Department and the Saltfleet Industrial Commission. The research was especially aided by Messrs. Peter Hammer and A. L. (Bert) Paterson. We also wish to acknowledge the assistance provided by our research team consisting of Michael Fenton, Doug Koch, and Laimonis Bergs.

The interviews were conducted during the summer of 1970 and all data provided in the monograph relate to the year 1969 unless otherwise specified.

The general industrial structure and the historical development of manufacturing in the Hamilton area are first briefly outlined. The subsequent, detailed analysis of the metal and machinery industries will cover the relative importance of the different types of metal manufacturing in terms of number of plants and employees, the nature of ownership and the significance of local entrepreneurship, material, market and service linkages and management attitudes to

the Hamilton area. The overall purpose is to provide an analysis of the structure and functioning of the Hamilton metal-working complex, which we hope will be particularly helpful to those involved with manufacturing in the area.

PART I

Historical Development

In the pre-railway era, Hamilton itself was much less important than several other settlements in the area both from the point of view of population and manufacturing. The location of the small industries of the early 19th century was dependent on water power, so that locations at the edge of the escarpment, such as at Dundas, were favoured. The opening of the Great Western Railroad in 1853 greatly stimulated Hamilton's industrial development and encouraged its first population boom. Accessibility to markets and materials was greatly improved and a variety of industries developed, including foundries, breweries and the manufacture of machines, carriages, and agricultural implements. The Great Western itself made a very important contribution by opening large railway shops to build locomotives, cars, rails and other equipment.

The city's industry developed and prospered during the 19th century despite occasional setbacks. Changing energy requirements favoured the location as coal gradually became the accepted source of power during the 1880's and 1890's. The city was extremely well-placed to receive cheap imports from Pennsylvania, whether by rail or lake. When electricity began to replace coal after 1898, Hamilton

was also ideally located being, in fact, one of the world's first recipients of electricity transmitted over a long distance, when the Cataract Power Company began to operate at Decew Falls.

While the industrial structure of the 19th century Hamilton was reasonably varied, after 1853 metal and metal-using industries were always very important. The domination of the industrial structure by this group, however, dates from 1896 when the first blast furnace began operating. Although inducements were needed to get the primary iron and steel industry off the ground, the fine location with easy access to ore and coal has encouraged expansion and development during the 20th century to the present day. The secondary metal industries in the Hamilton area have been further stimulated by local primary supplies.

The present industrial structure of the Hamilton area is still remarkably conditioned by the events of the late 19th and early 20th centuries, even to the extent that most of today's major plants began operations at that time. This is true not only of the Steel Company of Canada but also such concerns as Westinghouse, International Harvester and Otis Elevator. The success of these and other firms indicates the continuing locational advantage of the area for many industries, based particularly on a strategic location for most materials, especially those for the iron and steel industry, and for servicing the large Southern Ontario market.

Industrial Structure

The most striking feature of the industrial structure of the Hamilton area as revealed by Table 1 is the importance of the metal industries. The primary metal industry, dominated by the iron and steel production of the Dominion Foundry and Steel Company Limited (DOFASCO) and the Steel Company of Canada Limited (STELCO), is concentrated on Hamilton harbour in the City of Hamilton. This sector employs about 35 per cent of the area's total manufacturing labour force. Another 22 per cent of the area's manufacturing employment is in the metal fabricating and machinery industries. The average size of plant in these latter two sectors is smaller than is the case for primary metal mainly because of the enormous size of STELCO and DOFASCO. The large size of the metal-working sector has the effect of overshadowing all other segments of the industrial structure, so that no other major industrial group employs as much as 10 per cent of the area's labour force and, even in terms of the share of the number of establishments, only food processing exceeds this figure.

As the City of Hamilton employs nearly 90 per cent of the Hamilton area's work force, the industrial structure of the area as a whole is very much a reflection of that of the City, which is illustrated in Table 2. In contrast to the city, the suburban areas have a greater variety of industry and, in the metal sector, the primary activities play a relatively minor role. This is

TABLE 1

HAMILTON AREA: INDUSTRIAL STRUCTURE

MAJOR INDUSTRY GROUP	S.I.C. CODE	NUMBER OF PLANTS	% OF PLANTS	EMPLOYMENT	% OF EMPL.
Food and Beverages	1	74	11.2	4735	6.6
Rubber	3	5	0.8	2011	2.8
Leather	4	5	0.8	511	0.7
Textile	5	16	2.4	1677	2.3
Knitting Mills	6	3	0.4	147	0.2
Clothing	7	17	2.6	1535	2.1
Wood	8	27	4.1	831	1.2
Furniture and Fixtures	9	19	2.9	151	0.2
Paper and Allied	10	20	3.0	1366	1.9
Printing, Publishing and Allied	11	55	8.3	1458	2.0
Primary Metal	12	22	3.3	25143	34.8
Metal Fabricating	13	156	23.6	10368	14.4
Machinery (except electrical)	14	47	7.1	5810	8.0
Transportation	15	17	2.6	1364	1.9
Electrical Products	16	23	3.5	12396	10.4
Non-Metallic Mineral Products	17	60	9.1	3991	5.5
Petroleum and Coal Products	18	6	0.9	214	0.3
Chemical and Chemical Products	19	50	7.5	2595	3.6
Miscellaneous Manufacturing	20	39	5.9	793	1.1
TOTAL		661	100.0	77096	100.0

TABLE 2

CITY OF HAMILTON: INDUSTRIAL STRUCTURE

MAJOR INDUSTRY GROUP	S.I.C. CODE	NUMBER OF PLANTS	% OF PLANTS	EMPLOYMENT	% OF EMPL.
Food and Beverages	1	57	12.5	3509	5.5
Rubber	3	3	0.7	1963	3.0
Leather	4	4	0.9	331	0.5
Textile	5	16	3.5	1677	2.6
Knitting Mills	6	3	0.7	147	0.2
Clothing	7	16	3.5	1415	2.2
Wood	8	15	3.3	294	0.4
Furniture and Fixtures	9	12	2.6	66	0.1
Paper and Allied	10	13	2.8	1306	2.0
Printing, Publishing and Allied	11	43	9.4	1303	2.0
Primary Metal	12	14	3.0	24834	38.6
Metal Fabricating	13	103	22.1	8683	13.6
Machinery (except electrical)	14	30	6.5	5117	7.9
Transportation	15	7	1.5	876	1.4
Electrical Products	16	10	2.2	6655	10.3
Non-Metallic Mineral Products	17	45	9.8	3352	5.2
Petroleum and Coal Products	18	6	1.3	214	0.3
Chemical and Chemical Products	19	35	7.6	2066	3.2
Miscellaneous Manufacturing	20	28	6.1	567	1.0
TOTAL		460	100.0	69270	100.0

particularly true of Burlington, which has nearly 30 per cent of employment in metal and machinery industries but also has another five other categories employing 10 per cent or more of the labour force. Dundas has a higher proportion of its employment in the metal and machinery industries but also has strength in wood processing. In addition, the food and non-metallic mineral sectors are quite important. The metal and machinery industries have a similar share of employment in Saltfleet and Stoney Creek. However, remaining employment there is almost entirely found in the electrical products (32 per cent) and food and beverage (19 per cent) industries.

Metal and Machinery Industries

Turning specifically to the group of metal industries under consideration in this study, Table 6 indicates their relative importance in terms of the percentages of plants and employment. The employment distribution is heavily weighted towards the iron and steel, steel pipe and tube category (S.I.C. 291) and again reflects the extreme importance of STELCO and DOFASCO in the Hamilton area. There is a wide variety of other types of plant but only the agricultural implement (311), wire and wire products (305), miscellaneous machinery and equipment (315) and metal stamping, pressing and coating (304) industries are major employers.

A very different picture is presented by the column on percentage of plants. In this case, the most important category is hardware,

TABLE 3

BURLINGTON: INDUSTRIAL STRUCTURE

MAJOR INDUSTRY GROUP	S.I.C. CODE	NUMBER OF PLANTS	% OF PLANTS	EMPLOYMENT	% OF EMPL.
Food and Beverages	1	5	5.2	641	14.0
Leather	4	1	1.0	180	3.9
Wood	8	4	4.2	144	3.2
Furniture and Fixture	9	3	3.1	43	0.9
Paper and Allied	10	5	5.2	13	13.6
Printing, Publishing and Allied	11	5	5.2	52	1.1
Primary Metal	12	3	3.1	225	6.9
Metal Fabricating	13	24	25.0	849	18.6
Machinery (except Electrical)	14	7	7.3	188	4.1
Transportation Equipment	15	7	7.3	466	10.2
Electrical Products	16	4	4.2	110	2.4
Non-Metallic Mineral Products	17	11	11.5	451	10.0
Chemical and Chemical Products	19	13	13.5	515	11.2
Miscellaneous Manufacturing	20	4	4.2	87	1.9
TOTAL		96	100.0	4576	100.0

TABLE 4

DUNDAS: INDUSTRIAL STRUCTURE

MAJOR INDUSTRY GROUP	S.I.C. CODE	NUMBER OF PLANTS	% OF PLANTS	EMPLOYMENT	% OF EMPL.
Food and Beverages	1	7	15.2	184	10.5
Rubber	3	1	2.2	18	1.0
Clothing	7	1	2.2	120	6.9
Wood	8	5	10.8	328	18.8
Furniture and Fixture	9	2	4.4	26	1.5
Paper and Allied	10	1	2.2	35	2.0
Printing, Publishing and Allied	11	4	8.7	56	3.2
Primary Metal	12	2	4.4	60	3.4
Metal Fabricating	13	10	21.6	258	14.8
Machinery (except Electrical)	14	3	6.5	340	19.5
Electrical Products	16	3	6.5	70	4.0
Non-Metallic Mineral Products	17	3	6.5	165	9.4
Chemical and Chemical Products	19	2	4.4	14	0.8
Miscellaneous Manufacturing	20	2	4.4	73	4.2
TOTAL		46	100.0	1747	100.0

TABLE 5

SALTFLEET TOWNSHIP AND STONEY CREEK: INDUSTRIAL STRUCTURE

MAJOR INDUSTRY GROUP	S.I.C. CODE	NUMBER OF PLANTS	% OF PLANTS	EMPLOYMENT	% OF EMPL.
Food and Beverages	1	4	7.7	399	19.3
Rubber	3	1	1.9	30	1.4
Wood	8	3	5.8	65	3.1
Paper and Allied	10	1	1.9	12	0.6
Printing, Publishing and Allied	11	3	5.8	47	2.3
Primary Metal	12	2	3.9	22	1.1
Metal Fabricating	13	18	34.6	577	27.8
Machinery (except Electrical)	14	5	9.6	143	6.9
Transportation Equipment	15	3	5.8	22	1.1
Electrical Products	16	6	11.5	666	32.1
Non-Metallic Mineral Products	17	1	1.9	23	1.1
Miscellaneous Manufacturing	20	5	9.6	66	3.2
TOTAL		52	100.0	2072	100.0

tool and cutlery (S.I.C. 306), which includes a wide range of activities. One of the more important of these is tool and die manufacture, which provides an essential input for many other metal firms. This category is characterized by very small-scale plants, as illustrated by the fact that its percentage of the area's plants is more than ten times its percentage of employment. Other industries, which also stand out in terms of number of plants but not with respect to employment are ornamental and architectural metal (303), miscellaneous metal fabricating (309) and machine shops (308). The metal stamping, pressing and coating, wire and wire products and miscellaneous machinery and equipment industries, which all exhibit some strength as employers, are even more important in terms of the number of plants.

The overall plant size structure in terms of employment is shown in Table 7. The large number of small-sized plants is immediately apparent with 45 per cent having fewer than 15 workers and another 26 per cent in 15-49 worker category. This predominance of small establishments, very often having highly specialized functions, is typical of many of the world's major metal-working complexes such as the Birmingham-Black Country area in England.

Ownership and Local Entrepreneurship

About 70 per cent of the Hamilton area metal and machinery plants are owned by private companies but one third of these are

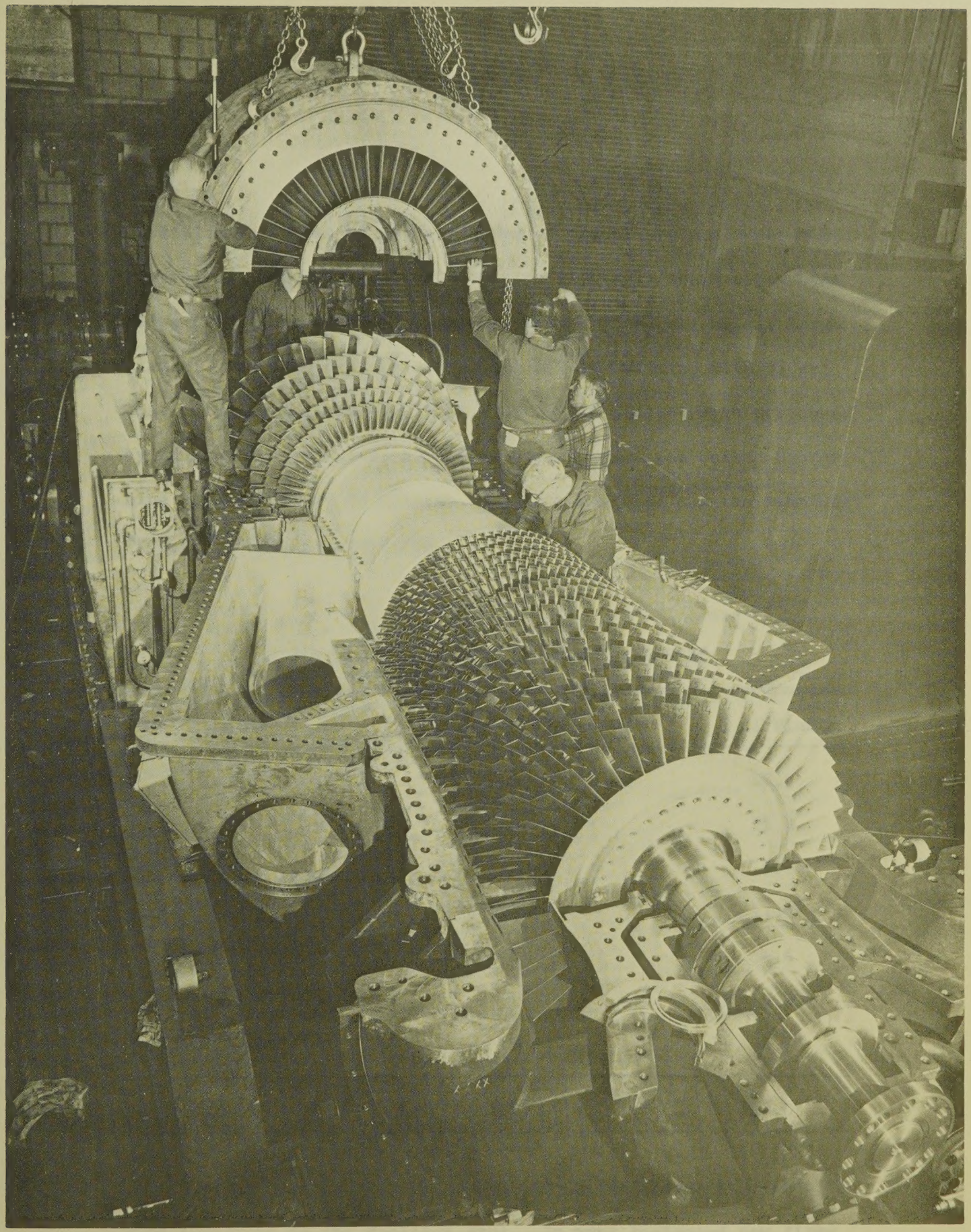
TABLE 6

METAL AND MACHINERY INDUSTRIES

INDUSTRY	% OF PLANTS *	% OF EMPLOYMENT ***
Iron and steel, steel pipe and tube mills	3.8	61.5
Iron foundries	2.2	1.3
Smelting and Refining	2.2	0.7
Aluminum Rolling, Casting and Extruding	1.6	0.2
Other Rolling, Casting and Extruding	2.2	0.2
Fabricated Structural Metal	2.7	2.8
Ornamental and Architectural Metal Products	9.9	2.2
Metal Stamping, Pressing and Coating	13.7	4.7
Wire and Wire Products	13.7	7.0
Hardware, Tool and Cutlery	20.3	1.8
Heating Equipment	2.7	0.3
Machine Shops	8.2	0.9
Miscellaneous Metal Fabricating	8.8	1.7
Metal Shearing	2.7	1.1
Agricultural Implement Industry	3.3	8.4
Miscellaneous Machinery and Equipment	12.6	5.1
Commercial Refrigeration and Air Conditioning	0.5	0.1

* Some plants produce items in more than one category therefore this column does not total 100 per cent.

** Employment at a multi-product plant is divided amongst the relevant categories.



The largest production gas turbine ever produced in Canada was manufactured in Hamilton. The giant turbine was installed at a gas liquids extraction plant near Empress Alberta, and is capable of outputs up to 27, 000 HP continuously. It will drive centrifugal compressors to restore pipeline natural gas to full pressure after it has passed through the liquids extraction plant.

subsidiaries. Most of the remainder of the plants are under the control of individuals or partnerships with only about 4 per cent being owned by public corporations, though these are mainly large plants. The head offices are almost all in Ontario, with 92 per cent being in the Hamilton area. Of the 46 plants which are owned by subsidiary companies, 28 are controlled from the United States, nine from elsewhere in Ontario, one from Montreal and the remainder from other foreign countries.

TABLE 7

NUMBER OF METAL PLANTS BY EMPLOYMENT SIZE

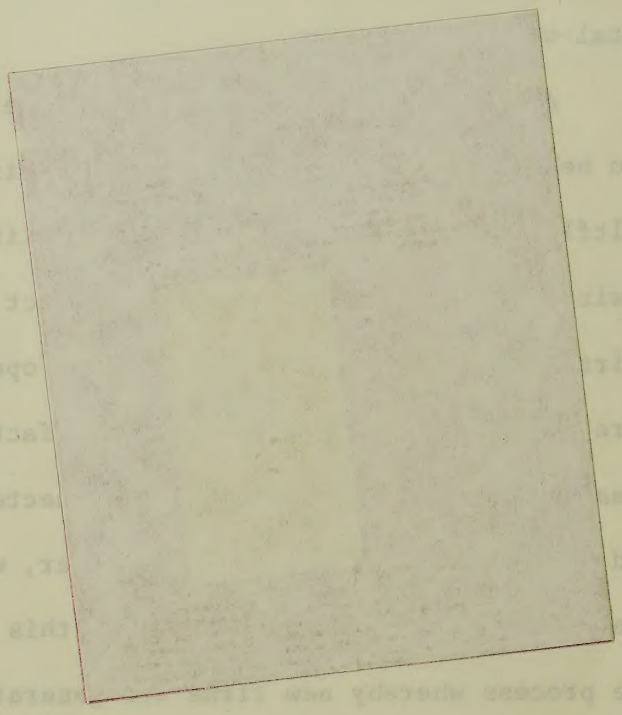
Size Category	Number of Plants	% of Plants
1 - 14	83	44.9
15 - 49	48	25.9
50 - 99	18	9.7
100 - 249	22	11.9
250 - 499	8	4.4
500 - 999	1	0.5
1000 and over	5	2.7
Total	185	100.0

It can be seen from these statistics that local ownership is very important in the Hamilton area. In many instances new firms

have been started by entrepreneurs formerly employed by other Hamilton industries. In 1969, there were sixty-five locally-owned plants which had commenced operations during the 1960's and, of these, 46 (71 per cent) were operated by persons with industrial experience in the Hamilton area. In only a few instances had these individuals owned other companies; usually they were launching out into entrepreneurship after having been employees in a related metal-working industry.

As an example of this process, the Saltfleet industrial district can be cited. This is a small, specialized industrial area in Saltfleet Township between the Queen Elizabeth Way, Barton Street, Dewitt and Green Roads. In the district about one third of all thirty-seven manufacturing plants are operated by entrepreneurs who were formerly employees of other manufacturing plants in the Hamilton area. Of these, two-thirds were connected with the metal industries and the remainder with printing, paper, wood-pattern making and transportation equipment. Clearly, this area has benefitted from the process whereby new firms are generated out of the existing industrial structure through the accumulation of technical and entrepreneurial skills. In most cases, the entrepreneurs look for a site as close as possible to their residence and to the industrial environment which is well known to them.

At the present time, these newly-created firms operate very small plants in terms of employment even by the standards of the

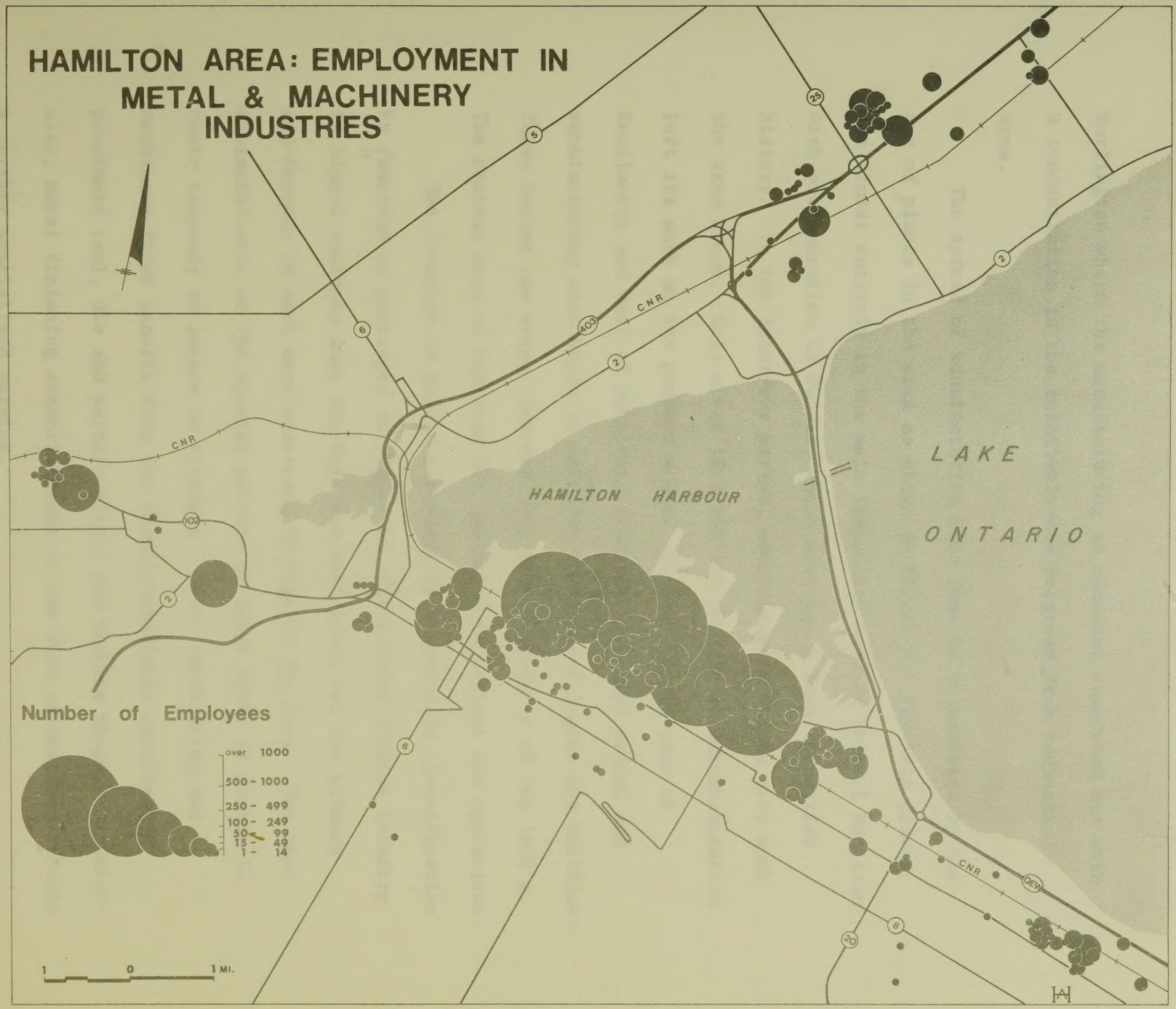


Saltfleet district. For example, seven have six or fewer employees, four have ten to twelve and the remaining one has forty. While local entrepreneurship is playing an important role in the development of the district, it is too early to establish whether or not these plants will expand significantly. This conclusion is also true for the Hamilton area as a whole since all the firms studied in terms of entrepreneurship are less than 10 years old. On the other hand, there is no shortage of firms which came into existance via this process prior to 1960, which presently contribute substantially to the Hamilton economy.

The Location of the Metal Industries within the Hamilton Area

Figure 2 shows the remarkable spatial concentration of employment in the metal-working industries. In the small area between Barton Street, Hamilton Harbour, John Street and Kenilworth Avenue, are found all of the area's largest plants and a sizeable proportion of the medium-sized ones. Generally, the closer to the waterfront, the larger the plant. At either end of this elongated concentration of industry are two smaller areas of medium and small scale operations focused on Queen and Carlone Streets in the west and Parkdale Avenue and Bright Street in the east. The other three main areas are the Saltfleet industrial district, a new industrial area characterised by small scale manufacturing, central Dundas with one medium-sized plant[1] but the remainder small, and

[1] This plant has since closed down.

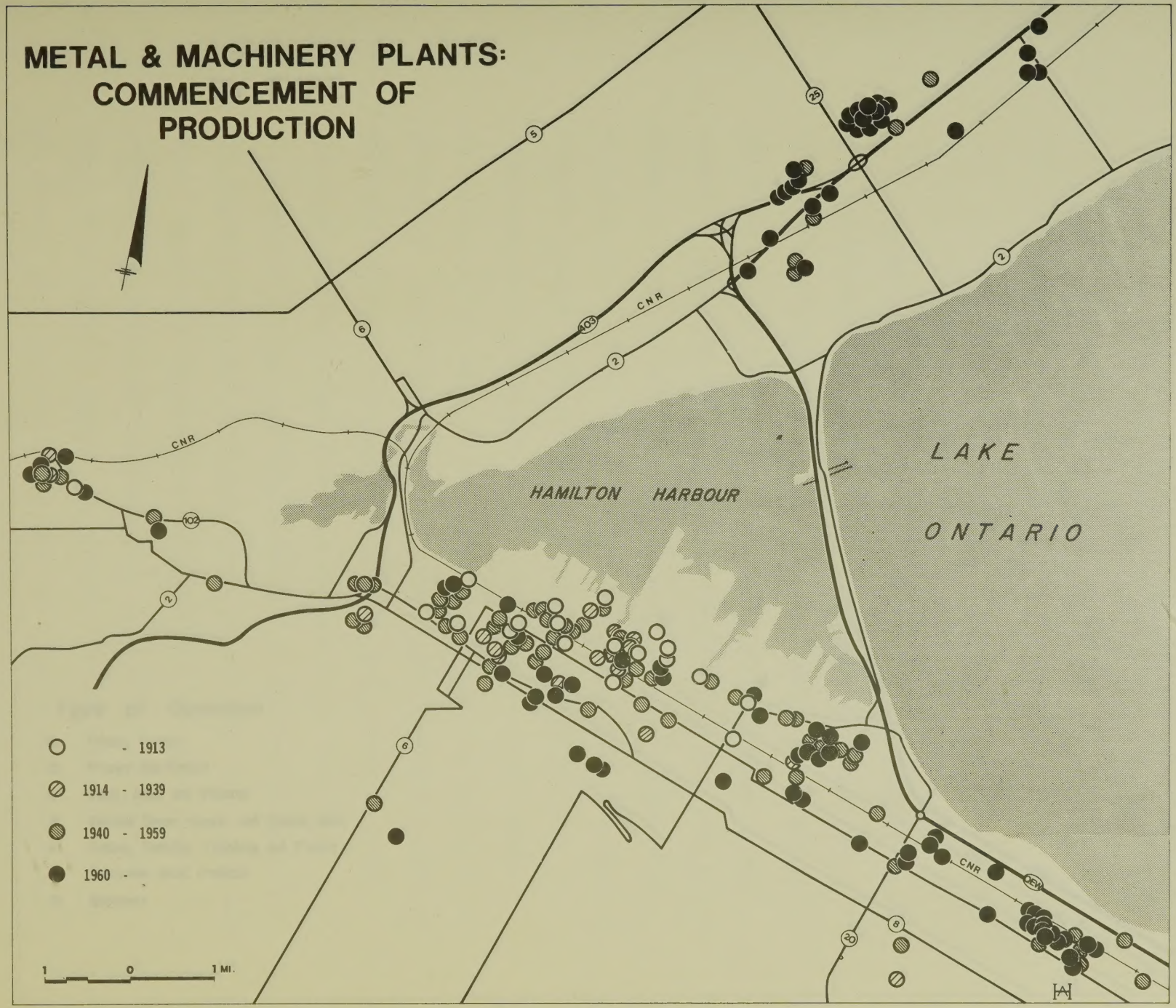

HAMILTON AREA: EMPLOYMENT IN METAL & MACHINERY INDUSTRIES
CNR
403
CNR
HAMILTON HARBOUR
LAKE ONTARIO
CNR
QEW
Number of Employees
over 1000
500 - 1000
250 - 499
100 - 249
50 - 99
15 - 49
1 - 14
1 0 1 MI.

METAL & MACHINERY
INDUSTRIES
HAMILTON AREA: EMPLOYMENT IN

Burlington where the manufacturing is somewhat scattered but with a concentration in the relatively-new Progress Park industrial area.

The spread of manufacturing over time is illustrated by the age of plants in the area as shown in Figure 3. Pre-1914 plants are almost entirely in the main industrial core of central Hamilton with one exception in Dundas, which also has a long industrial history. In the inter-war period, manufacturing was in very much the same areas. Only since 1940 has the process of suburbanisation left its mark on the present scene. Several plants east of Kenilworth and west of John date from the 1940-1959 period and manufacturing also began to make its mark in Burlington and Saltfleet. These latter two areas, however, are mainly products of the 1960's. The central area of Hamilton has continued to attract new operations.

The location of plants according to a sevenfold classification by function is portrayed in Figure 4. The primary ferrous industry is almost entirely near the Hamilton waterfront but the primary non-ferrous is much more scattered throughout the area. The main characteristic of the spatial pattern of other types of plants is their tendency to locate in clusters. Metal fabricating and machinery firms benefit from the readily-available services of proximate tool, die and pattern plants and machine shops. Occasionally, metal finishing establishments of one form or another, provide a further specialised service.


METAL & MACHINERY PLANTS:
COMMENCEMENT OF
PRODUCTION
HAMILTON HARBOUR
LAKE
ONTARIO
CNR
CNR
CNR
403
102
5
6
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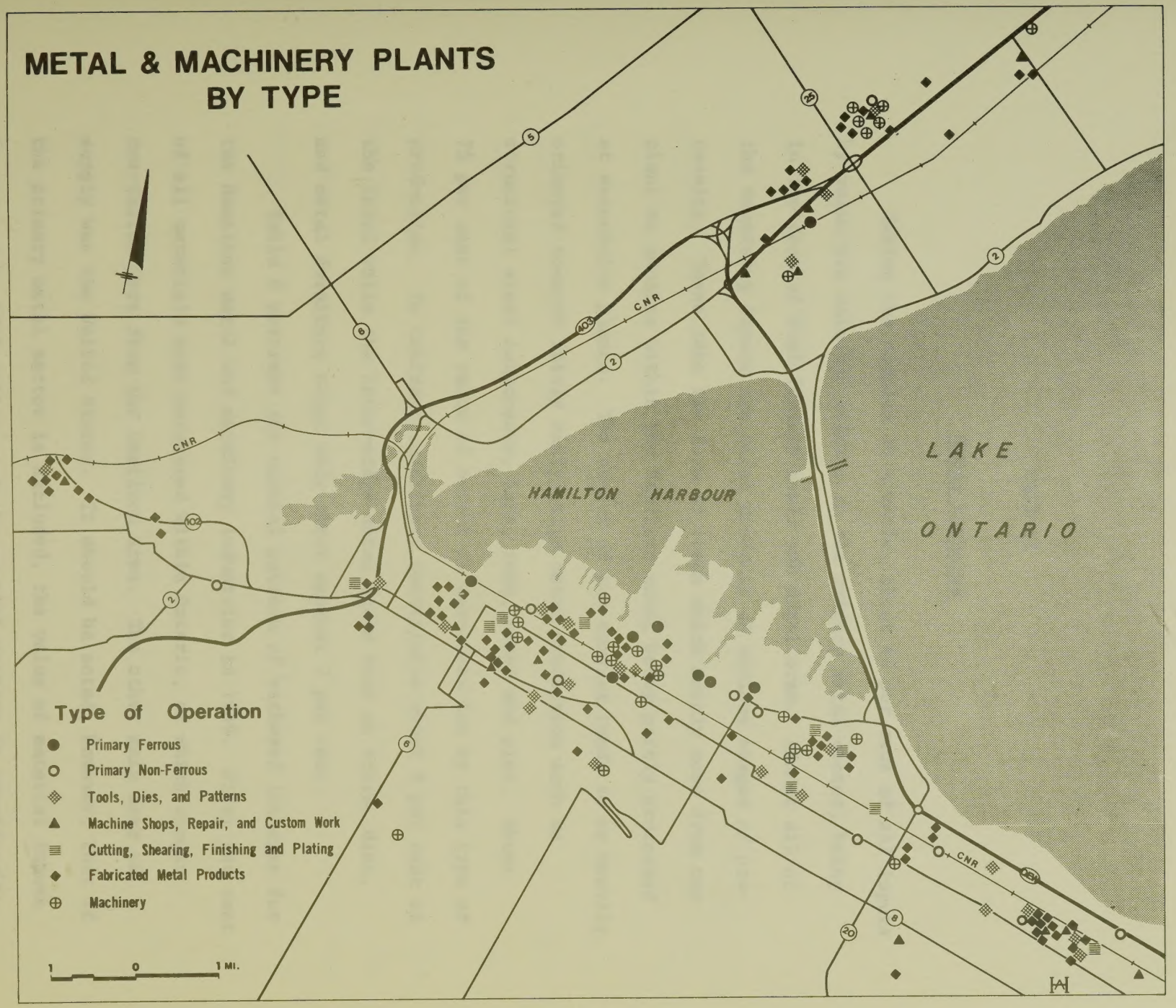
METAL & MACHINERY PLANTS
COMMENCEMENT OF
PRODUCTION


METAL & MACHINERY PLANTS
BY TYPE
CNR
CNR
CNR
HAMILTON HARBOUR
LAKE
ONTARIO
Type of Operation
Primary Ferrous
Primary Non-Ferrous
Tools, Dies, and Patterns
Machine Shops, Repair, and Custom Work
Cutting, Shearing, Finishing and Plating
Fabricated Metal Products
Machinery
1 0 1 MI.

PART II

Goods Linkages

Taking the complex as a whole, about 40 per cent of all inputs by value are directly related to the primary metal sector, being in the form of fuel (mainly coal) and metal ores. Almost all of the remaining inputs are metal products at various stages of processing. These take the form of items which mainly move from one plant to another within the Hamilton area, being partly processed at successive plants. The output of the complex tends to be heavily oriented towards fairly early-stage metal production such as structural steel components, bars, rods, sheet and pipe. About 75 per cent of the value of output is accounted for by this type of production. In contrast, machinery constitutes about 8 per cent of the total while the later-stage metal items such as tools, dies, and metal furniture total only about another 7 per cent.

Table 8 portrays the spatial pattern of backward linkages for the Hamilton metal and machinery industries in 1969. Fifty per cent of all materials were purchased within Ontario, of which almost two-thirds were from the Hamilton area. The other main area of supply was the United States. It should be noted, however, that if the primary metal sector is excluded, the value of material inputs is reduced by $238 million and the spatial pattern is considerably

TABLE 8

HAMILTON AREA METAL AND MACHINERY INDUSTRIES

MATERIAL LINKAGES BY VALUE, 1969

MATERIAL SUPPLY AREA	TOTAL		PRIMARY METAL		METAL FABRICATING AND MACHINERY	
	$ MILLION	%	$ MILLION	%	$ MILLION	%
Ontario	190	50.0	72	30.3	118	83.1
Hamilton Area	122	32.1	43	18.1	79	55.6
Metro Toronto	24	6.3	10	4.2	14	9.9
Quebec	7	1.8	2	0.8	5	3.5
Western Canada	20	5.3	18	7.6	2	1.4
Atlantic Provinces	29	7.6	29	12.2	0	0.0
United States	125	32.9	112	47.1	13	9.2
Other Foreign Countries	9	2.4	5	2.2	4	2.8
TOTAL	380	100.0	238	100.0	142	100.0

modified. The United States' share of material supply is reduced from 33 per cent of the total to only 9 per cent. In contrast, Ontario's share rises to 83 per cent and the Hamilton area alone supplies 56 per cent of the total materials. The primary sector is clearly more dependent on distant areas, both within Canada and outside the country, than the metal-fabricating and machinery industries. In view of the dependence of primary iron and steel industries on large supplies of coal and iron ore, this linkage pattern is not surprising.

An examination of Table 9 reveals that the marketing pattern for the metal-working complex is significantly different from the material supply conditions. In this case, 76 per cent of products are sold within Ontario. While some firms did not provide a detailed breakdown by place for Ontario, and therefore metropolitan Toronto and the Hamilton area are probably underestimated in this table, their respective shares were 17 per cent and 13 per cent of total output by value. Quebec and the Western Provinces figure more prominently as markets than they did as sources of material while the Atlantic Provinces and foreign countries, especially the United States, are much less important as markets than in the provision of materials. When the primary sector is excluded, the pattern again changes markedly. In this case, the United States becomes a much more important market for the metal fabricating and machinery sectors than for the complex as a whole, (19 per cent as opposed to 6 per cent).

TABLE 9

HAMILTON AREA METAL AND MACHINERY INDUSTRIES

MARKET LINKAGES BY VALUE, 1969

MARKET AREA	TOTAL		PRIMARY METAL		METAL FABRICATING AND MACHINERY	
	$ MILLION	%	$ MILLION	%	$ MILLION	%
Ontario	893	75.5	741	83.1	152	52.1
Hamilton Area	155	13.1	127	14.2	28	9.6
Metro Toronto	197	16.6	152	17.0	45	15.4
Quebec	100	8.4	75	8.4	25	8.6
Western Canada	103	8.7	51	5.8	52	17.7
Atlantic Provinces	7	0.6	1	0.1	6	2.1
United States	76	6.4	20	2.2	56	19.2
Other Foreign Countries	5	0.4	4	0.4	1	0.3
TOTAL	1,184	100.0	892	100.0	292	100.0

Foreign Ownership and Goods Linkages

The analysis of the relationship between foreign ownership and material linkages is conducted on the basis of data for the non-primary sector of the metal-working complex. In terms of the value of inputs and outputs, the primary sector dominates the whole complex. The sector is itself overshadowed by two major firms, both of which are Canadian-owned, so that any analysis based on it would not be useful. Moreover, material supplies for the primary metal sector are only available from a relatively limited number of sources compared to those for the later stages of metal-processing.

There is little difference in the spatial patterns of material linkages for the foreign and Canadian-controlled plants (See Table 10). A remarkably similar proportion of goods are supplied from within Ontario, although the Hamilton area is less important and Metropolitan Toronto more important to the Canadian-controlled plants. The only other differences worth noting are that the foreign-controlled plants buy relatively less materials from Quebec and relatively more from abroad than Canadian ones. Supplies from the United States are almost identical.

A far more striking contrast is evident in Table 11, in which the market linkages are portrayed. It is immediately apparent that the Ontario market is vastly more important to the Canadian-controlled plants. The much greater orientation to the Ontario market plus the smaller value added in manufacturing for the Canadian group are

TABLE 10

MATERIAL LINKAGES FOR THE HAMILTON AREA METAL FABRICATING AND MACHINERY INDUSTRIES BY OWNERSHIP, 1969

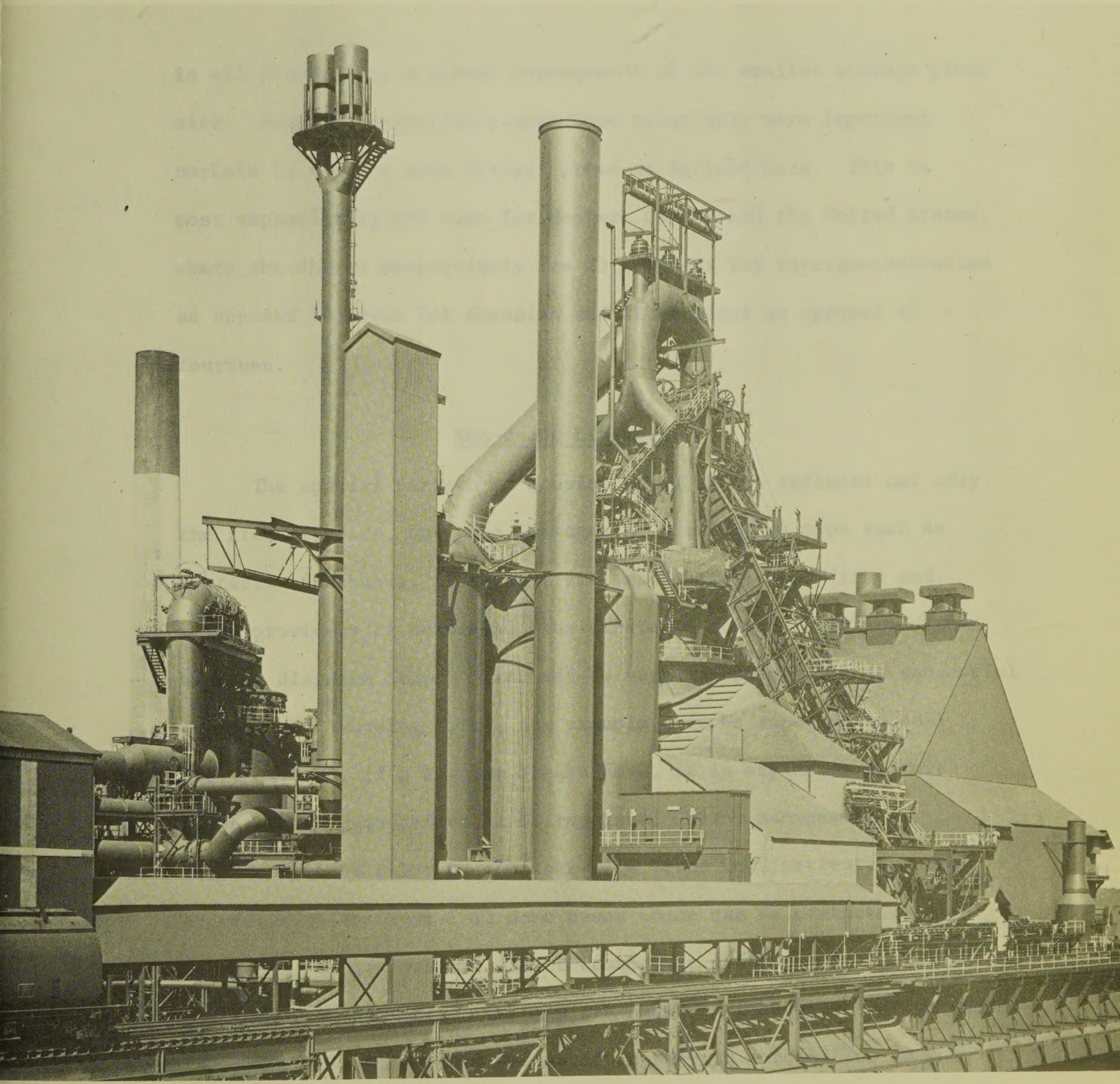
MATERIAL SUPPLY AREA	FOREIGN-CONTROLLED PLANTS		CANADIAN-CONTROLLED PLANTS	
	$ million	% *	$ million	% *
Ontario	66	83.2	51	84.1
Hamilton Area	46	57.7	33	53.4
Metro Toronto	5	9.2	9	14.0
Quebec	2	2.6	3	4.8
Western Canada	1	1.6	1	1.1
Atlantic Provinces	0	0.0	0	0.0
United States	7	9.2	5	8.7
Other Foreign Countries	3	3.4	1	1.3
TOTAL	79	100.0	61	100.0

* Percentage figures are calculated on original data rather than the rounded figures portrayed here. Note that because of rounding the total of columns 1 and 3 does not equal that in column 5 of Table 8.

TABLE 11

MARKET LINKAGES FOR THE HAMILTON AREA METAL FABRICATING AND MACHINERY INDUSTRIES BY OWNERSHIP, 1969

MARKET AREA	FOREIGN-CONTROLLED PLANTS		CANADIAN-CONTROLLED PLANTS	
	$ million	% *	$ million	% *
Ontario	83	42.1	69	72.0
Hamilton Area	29	14.7	19	17.2
Metro Toronto	9	4.5	17	19.9
Quebec	19	9.6	6	6.6
Western Canada	45	22.9	7	6.9
Atlantic Provinces	5	2.7	1	0.8
United States	43	22.1	13	13.6
Other Foreign Countries	1	0.6	0	0.1
TOTAL	196	100.0	96	100.0



The 6 million ton per annum blast furnace capacity of Hamilton was recently augmented by the construction of the above 3, 500 tons a day, $30 million blast furnace. The new unit is equipped with computer control for greater accuracy and efficiency.

TABLE 12

NON-GOODS LINKAGES OF THE HAMILTON AREA METAL INDUSTRIES

TYPE OF SERVICE	NUMBER OF LINKAGES	% OF LINKAGES
Banks	192	10.0
Investment Dealers	35	1.8
Insurance	137	7.1
Real Estate	11	0.6
Public and University Education Schemes	26	1.4
Extension or Vocational Programmes	16	0.8
Accountants	136	7.1
Advertising, Printing, and Photography	153	8.0
Engineering and Scientific	25	1.3
Legal	135	7.0
Management Consultants	15	0.8
Data Processing	39	2.0
Local Government	10	0.5
Provincial and Regional Government	29	1.5
Federal Government	41	2.1
Labour Organisations	22	1.1
Repair Shops	77	4.0
Welding	35	1.8
Piping - plumbing	43	2.2
Electrical	67	3.5
Sub-contract work	49	2.6
Architectural	9	0.5
Security	26	1.4
Transport Companies	444	23.1
Warehousing	12	0.6
Domestic and Machinery Movers	28	1.5
Waste Disposal	107	5.7
TOTAL	1919	100.0

by the Hamilton metal-working plants. The linkage in this table is independent of the frequency of contact so that, for example, an annual link and a daily link both count as one linkage.

In terms of the relative proportion of linkages, transportation services stand out as being of major importance, with an average number of more than two linkages per plant. In fact as many as ten regular linkages of this type are not uncommon. Next in importance are banks, advertising, printing and photography, insurance, accountants and lawyers.

The last row of Table 13 indicates the frequency of contact for all non-goods linkages. Of greater interest is the variation by type of service. The most common daily contacts are with transportation firms and banks, which together make up 70 per cent of this total. The use of these services also dominates the weekly contacts but waste disposal is also relatively important in this case. Monthly linkages are prominent with advertising, printing and photography firms and accountants as well as transportation ones. Not surprisingly, annual contacts are most common in connection with insurance, legal services, accounting and advertising, printing and photography. It should be noted that the number of linkages cannot be taken as a direct measure of the importance of a service to the plant. For example, machinery may only need to be repaired very occasionally but immediate repair is usually essential and proximity to this service may be of more

TABLE 13

TYPE OF SERVICE LINKAGE BY REGULARITY OF CONTACT

TYPE OF SERVICE	1	2	3	4	5	6	TOTALS
Banks	118	64	7	3			192
Investment Dealers	13	7	8	7			35
Insurance	3	5	24	104		1	137
Real Estate		2	3	6			11
Public and University Education Schemes		7	7	5	1	6	26
Extension or Vocational Programmes		1	6	4		5	16
Accountants	4	5	40	84		3	136
Advertising, Printing, and Photography	8	13	53	74	3	2	153
Engineering and Scientific	3	4	7	9	1	1	25
Legal	3	5	27	90	3	7	135
Management Consultants	2	3	1	4	4	1	15
Data Processing	11	11	14	2	1		39
Local Government	2	1	1	6			10
Provincial and Regional Government		1	17	9		2	29
Federal Government	4	6	9	15	2	5	41
Labour Organisations	2	3	3	6	4	4	22
Repair Shops	8	16	26	18	3	6	77
Welding	3	10	12	10			35
Piping - plumbing	1		14	23	1	4	43
Electrical	3	10	23	28		3	67
Sub-contract work	9	5	17	11	2	5	49
Architectural	1		1	6	1		9
Security	21	1	2	1		1	26
Transport Companies	240	79	78	43		4	444
Warehousing	4	3	4	1			12
Domestic and Machinery Movers	1		4	19	4		28
Waste Disposal	8	67	24	7		1	107
TOTALS	472	329	432	595	30	61	1919

1 = Daily
2 = Weekly
3 = Monthly
4 = Annually
5 = Quarterly
6 = Irregular

locational significance than to others which are used more frequently.

It might be asked, "To what extent does the Hamilton area provide the necessary services for its metal-working industries?" Table 14 shows that over four-fifths of all service linkages are made in the area. The only other area which is of any significance in this connection is Metropolitan Toronto, which accounts for nearly 13 per cent of such linkages. It is interesting to see if Toronto meets a particular type of need and also if Hamilton cannot provide it at the present time. For this purpose, a comparison between Tables 12 and 15 is helpful. Somewhat surprising is the fact that transportation linkages form a higher percentage of linkages with Metropolitan Toronto than they do for all non-goods linkages. Hamilton area firms turn to Toronto for the less frequently used and more specialised transportation facilities, including air transport. This is generally true of all Toronto contacts, which include relatively high use of advertising, printing and photography, legal and insurance businesses. It would seem that only management consultants, where Toronto accounts for two-thirds of the fifteen linkages, may be deficient in the Hamilton area and they are very infrequently used. It may be concluded, therefore, that the Hamilton area provides a very comprehensive range of services, which are extensively used by its metal-working firms.

TABLE 14

LOCATION OF NON-GOODS LINKAGES

AREA	NUMBER OF LINKAGES	% OF LINKAGES
Hamilton Area	1555	81.0
Rest of Niagara Region	15	0.8
Metropolitan Toronto	245	12.7
Midwestern Ontario Region	7	0.4
St. Clair Region	3	0.2
Eastern Ontario Region	36	1.9
Lake Erie Region	9	0.5
Rest of Ontario	3	0.2
Rest of Canada	34	1.7
Foreign	12	0.6
TOTAL	1919	100.0

TABLE 15

TYPE OF NON-GOODS LINKAGES WITH METROPOLITAN TORONTO

LINKAGE TYPE	NUMBER OF LINKAGES	% OF LINKAGES
Banks	8	3.3
Investment Dealers	5	2.0
Insurance	26	10.6
Public and University Education	2	0.8
Extension or Vocational Education	2	0.8
Accountancy	13	5.3
Advertising, Printing and Photography	33	13.6
Engineering and Scientific	5	2.0
Legal	27	11.0
Management Consultancy	9	3.7
Data Processing	7	2.9
Local Government	2	0.8
Provincial and Regional Government	17	6.9
Federal Government	1	0.4
Labour Organisations	3	1.2
Repair Shops	7	2.9
Piping - plumbing	1	0.4
Sub-contracting	3	1.2
Security	1	0.4
Transportation Firms	71	29.0
Warehousing Services	1	0.4
Domestic and Machinery Movers	1	0.4
TOTAL	245	100.0

Contrasts between inner city and suburban plants are illustrated by comparing nine matched pairs of metal-working plants from central Hamilton and Burlington. These were matched in terms of type of production and scale of operation. One might expect differences in the quality and quantity of services provided in these contrasting areas and therefore in the distances over which the non-goods linkages operate.

The nine firms in Burlington and central Hamilton each in aggregate generated about one hundred linkages. With respect to the distance over which these linkages operated, a clear distinction can be observed between the two areas. In the inner city, 25 per cent of all linkages were within 0.5 miles, 50 per cent within 0.8 miles and 75 per cent within four miles. For Burlington, in contrast, 25 per cent were within two miles, 50 per cent within 10.5 miles (the approximate distance to downtown Hamilton) and 75 per cent within 12.8 miles. These data illustrate the very close contact with service firms in the inner city and the fact that the suburban plants quite often use the central city, despite its distance, for some types of services. By and large, the type of service used is roughly comparable, with the principal exception of transportation services, which are more important in the central city.

Three particular services have been chosen to exemplify the characteristics of these non-goods linkages. Table 16 provides detail on the number, frequency and location of contacts. In terms

TABLE 16

NON-GOODS LINKAGES OF SELECTED COMPARABLE PLANTS IN BURLINGTON AND CENTRAL HAMILTON

	BURLINGTON	HAMILTON
A. COMMERCIAL BANKS		
1. Number of Contacts and Frequency	8 Daily 1 Weekly	9 Daily 2 Weekly
2. Location of Service	4 Burlington 4 Hamilton 1 Toronto	9 Hamilton 1 Toronto 1 Brockville
B. ACCOUNTANTS		
1. Number of Contacts and Frequency	1 Monthly 4 Annually 1 Irregular	1 Daily 1 Monthly 5 Annually
2. Location of Service	5 Hamilton 1 Toronto	7 Hamilton
C. TRANSPORTATION SERVICES		
1. Number of Contacts and Frequency	7 Daily 7 Weekly 4 Monthly 1 Annually	24 Daily 6 Weekly
2. Location of Service	5 Burlington 9 Hamilton 4 Toronto 1 Other	27 Hamilton 3 Toronto

of the frequency with which banking facilities are used, there is clearly little difference. However, it is worth noting that only four Burlington plants availed themselves of local banking facilities, while the inner city plants, with one exception, all did so. In the case of accountants, the Burlington plants are almost completely dependent on Hamilton. The differences between the two areas are more pronounced in the case of transportation services. The inner city plants generate thirty linkages as opposed to nineteen for Burlington and a much higher proportion of these are on a daily basis. Burlington again is very dependent on Hamilton, although transportation firms in Toronto are more often used than is the case for banking or accountancy.

PART III

Management Evaluation of the Hamilton Area

Interviewees (owners or managers) at each of the metal-working plants were asked to give an evaluation of their location. Firstly, they were asked for up to three advantages and three disadvantages of the Hamilton area as a whole. The results of these questions are summarized in Table 17. In general, many more advantages are seen than disadvantages and in fact over 40 per cent of managements cite no disadvantages at all. Principal advantages of the area are proximity to markets and materials. The advantage of good accessibility, mentioned by a further 18 per cent of managements, is closely associated with this advantage of proximity. It would seem that manufacturing plants in the Hamilton area have low transportation costs. The other major attraction is the availability of skilled labour, but it should be noted that nearly as many managements viewed expensive labour as the principal disadvantage. Other problems are relatively minor.

The second part of this evaluation of location was with respect to the actual site of the plant within the Hamilton area. The responses in this case are indicated in Table 18. Once again perceived disadvantages are relatively uncommon and the only major one is lack of space for expansion, which is essentially a central

TABLE 17

MANAGEMENT ATTITUDES TO THE HAMILTON AREA

PERCEIVED ADVANTAGES *	NO. OF TIMES CITED	% OF ALL PLANTS	PERCEIVED DISADVANTAGES **	NO. OF TIMES CITED	% OF ALL PLANTS
Proximity to market	92	50.5	Expensive labour	38	20.9
Proximity to materials	79	43.4	Local market relatively small	21	11.5
Available skilled labour	47	25.8	Lack of skilled labour	10	5.5
Good accessibility	33	18.1	Distasteful local environment	10	5.5
Personal advantages	22	12.1	High taxes	8	4.4
Available services	12	6.6	Deficient material supply	6	3.3

* Managers of 29 plants did not cite any advantages

** Managers of 80 plants did not cite any disadvantages

TABLE 18

MANAGEMENT ATTITUDES TO SITE

PERCEIVED ADVANTAGES *	NO. OF TIMES CITED	% OF ALL PLANTS	PERCEIVED DISADVANTAGES **	NO. OF TIMES CITED	% OF ALL PLANTS
Good accessibility	74	40.7	Lack of space for expansion	34	18.7
Proximity to material suppliers	32	17.6	Poor local roads and loading facilities	17	9.3
Inexpensive land or rent	24	13.2	Inadequate public transit	14	7.7
Proximity to markets	19	10.4	Expensive land or rent	10	5.5
Proximity to labour supply	10	5.5	Congestion	10	5.5
Available space for expansion	8	4.4	Lack of parking space	9	4.9
Pleasing local environment	7	3.8	Poor quality physical plant	9	4.9
			Pollution	7	3.8

* Managers of 45 plants did not cite any advantages

** Managers of 84 plants did not cite any disadvantages

city concern. The combination of good accessibility and proximity to material suppliers and markets are dominant site advantages with inexpensive land or rent also quite important.

The site evaluations hide differences between the newer suburban areas and the older central city ones. These differences are illustrated in a comparison between all firms in two small areas, the Saltfleet industrial district and the area just east of downtown Hamilton bounded by John, the railway tracks north of Barton, King and Wellington. Sixteen of the thirty-six Saltfleet plants did not list any disadvantages, whereas only five could name no real advantage. Saltfleet has considerable attraction due to the availability of land for new plants or expansions at a relatively inexpensive cost and also its very good accessibility by both road and rail. The principal disadvantage of the district is the lack of adequate transit facilities for workers, especially female ones. A much higher proportion of the inner city plant managers perceive disadvantages, mainly relating to inadequacies of plants, difficulty of loading, shortage of space to expand and high land or plant costs. Inner city plant managements also see many advantages, however. In particular, proximity to buyers, closeness to non-goods services, accessibility and public transit, are notable.

Conclusion

This study has attempted to provide a data base which allows for a fuller understanding of the nature of the Hamilton metal industries and the way in which they function. The description and analysis of these data as presented in this monograph should prove useful both to those with a general interest in the Hamilton area and to those involved with its future development. In this section, we will try to indicate those findings which seem to have some particular significance for the future of the metal industries and the area in general.

Management attitudes towards the area in which they are situated are indicative of the quality of the location of their plants. It is quite evident on this basis that the Hamilton area is a very advantageous one for metal-working plants. Nevertheless there are some problems which are sufficiently widespread to warrant attention. In particular, a quarter of all plant managements cite labour cost or a shortage of skilled labour as a disadvantage in the area. One possible ameliorative measure might be increased attention to further development of the appropriate vocational training programmes in the area.

With regard to the evaluation of specific sites, different areas within the Hamilton area evoke different attitudes. The

suburban areas often have adequate space for a modern plant layout with room for future expansion but occasionally find that inadequate public transit leads to difficulties in recruiting labour. The older, inner city section has the advantage of being near to materials and services and sometimes markets but plants there characteristically are short of space for expansion, lack parking facilities and suffer from loading and unloading problems due to antiquated loading bays and narrow, congested streets.

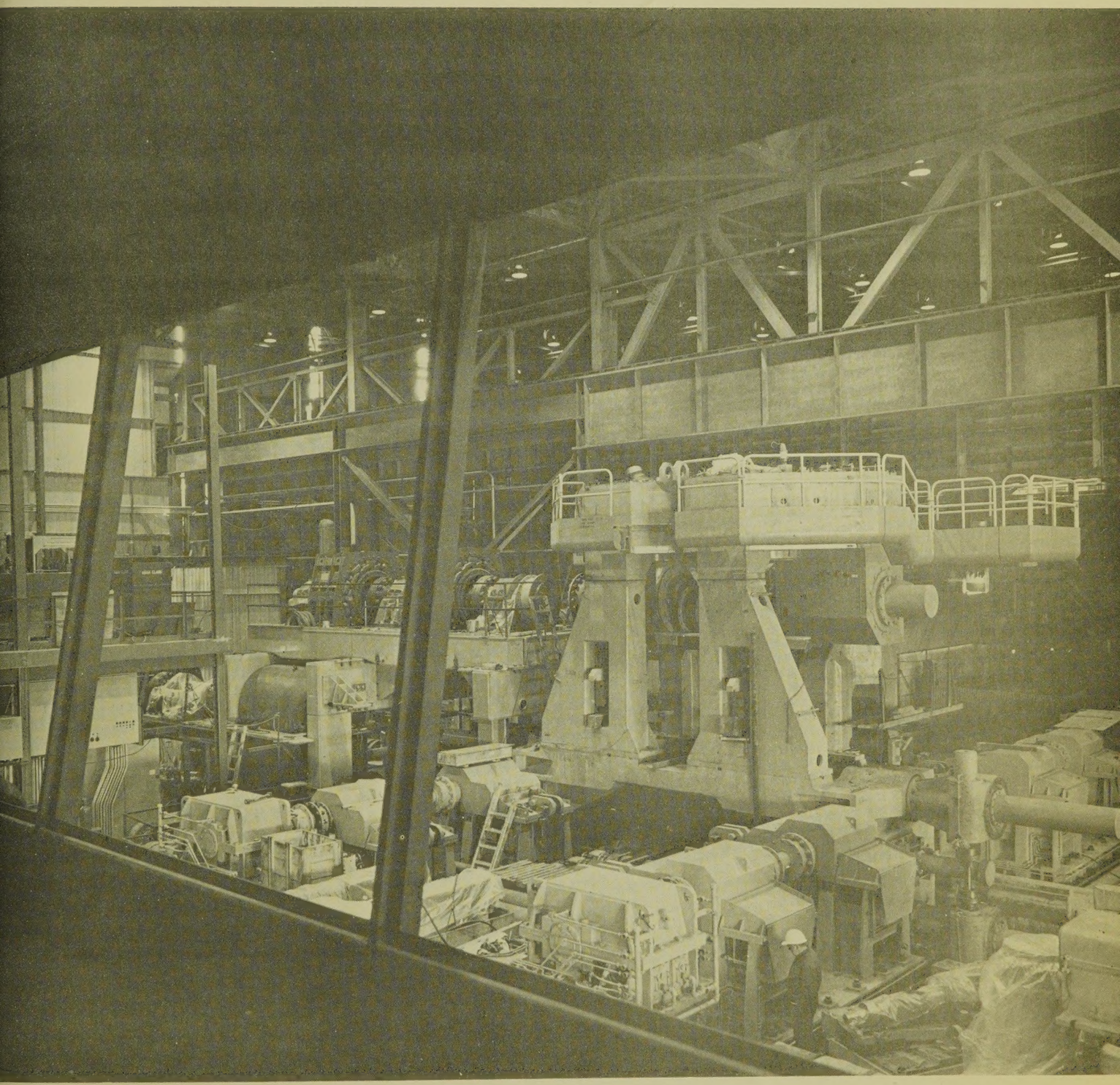
The suburban industrial sites are generally very favourably regarded although one possible improvement would be the institution of better public transit to the industrial areas. Generally, this is more critical for industries using a higher proportion of female labour than is common in the metal industries. In the inner city, older industrial areas play an important role. Manufacturing plants in such areas are often quite small and tolerate some of the problems involved in order to obtain a lower cost structure through improved accessibility and lower rents. These areas are often characterised by an admixture of functions, with residential land often included. There are often functional relationships between the residential commercial and manufacturing land uses which are critical to the economic viability of the concerns. These should not be disrupted by the zoning of large areas of the inner city for a single use but, on the other hand, block by block zoning might reduce the congestion while sustaining the viability of such areas as a whole.

For example, in the industrial blocks, a small firm could start or expand in very cheap facilities such as an old house. Within these industrial zones, cars could either be banned with the accompaniment of improved public transit, or small car parks provided on formerly residential lots. Meanwhile, in the residential blocks, trucks would not be permitted.

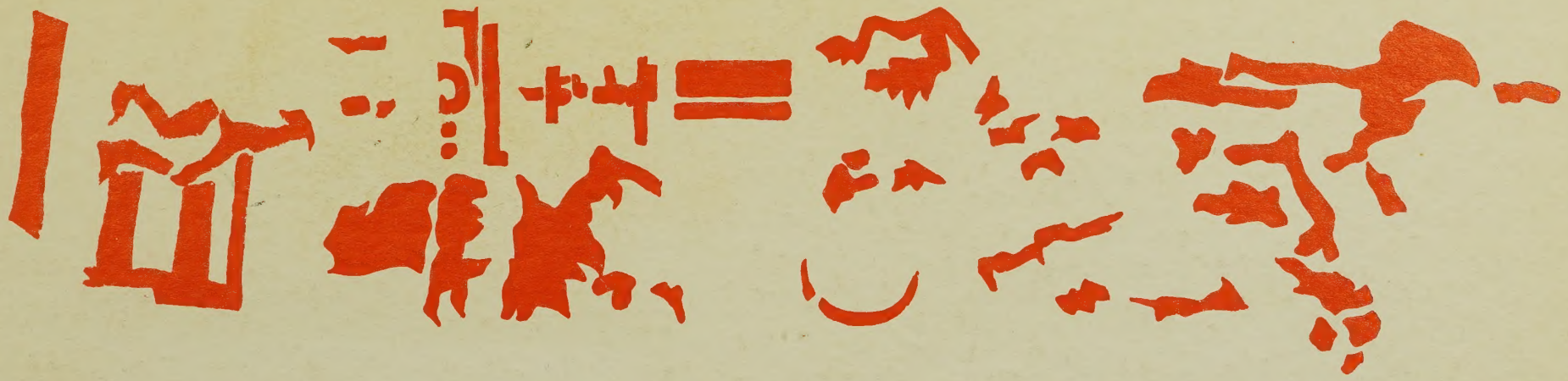
For sustained industrial development, it is imperative that facilities suited to the needs of new entrepreneurs and small-scale establishments be available. These needs typically have been dominated by a low overhead and market or raw material accessible site. It is this type of facility that the central city industrial areas have traditionally provided. It should be remembered in this connection that 71 per cent of new metal-working plants started during the 1960's, and still in operation in 1969, were started by new entrepreneurs who had had industrial experience in the Hamilton area. Moreover, it has been demonstrated that locally-owned firms make greater use of Hamilton area industrial services than do those controlled from outside. For these reasons, it is essential that there are areas within the community where new firms can begin operations.

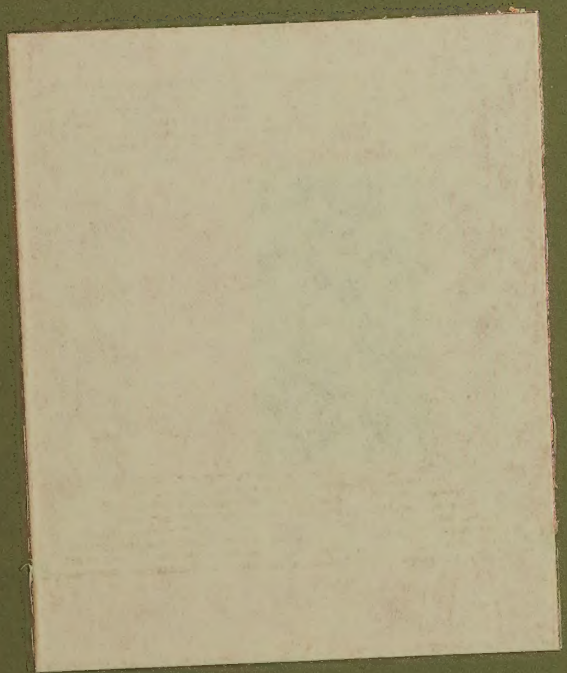
The data on goods linkages indicates the high degree of interrelationship amongst the metal-working plants of the Hamilton area. The primary metal sector supplies a substantial value of its products to other plants within the Hamilton area and in fact

these metal fabricating and machinery plants buy 56 per cent of their total material inputs within the area. All plants rely heavily on local industrial services. This complex pattern of material market and service interrelationships is the primary reason for the favourable disposition of present manufacturers to the area, its continuing ability to attract industry from outside and its success in spawning new industry from within.



A new universal slabbing mill using the latest in computer technology for monitoring and controlling rolling operations. The $25 million installating was recently put into operation in Hamilton.





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